



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 6
ANOMALY REPORT NO. 10

SERVICE MODULE QUAD C
TEMPERATURE EXCURSIONS

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MODULE QUAD C TEMPERATURE EXCURSIONS
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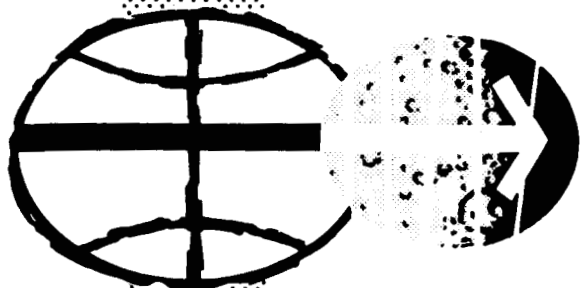
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MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

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SERVICE MODULE QUAD C TEMPERATURE EXCURSIONS

STATEMENT

Low temperature excursions were indicated on one injector of the service module reaction control system.

DISCUSSION

During four intervals in the cold-soak period, the indicated temperature of the injector for the clockwise roll engine in quad C decreased sharply from approximately 110° F to below 0° F and recovered at essentially the same rate (fig. 1). Rates of change were as high as 55° F/sec. Temperature changes caused by environmental conditions were several times slower, and no other temperature measurement showed this type of transient.

Ground tests have shown that engine pulse-mode firings can cause injector cooling, but because of the injector mass, this cooling could not be as rapid as that experienced. Further, if the injector temperature had decreased as indicated, the engine package temperature (fig. 2) would have dropped as shown in figure 1. An intermittent propellant leak could have chilled the injector transducer; however, no subsequent heating rate could account for the rapid temperature recovery.

Analysis of the temperature transducer and signal conditioner showed no electrical failure mode which would cause an excursion of this nature.

CONCLUSION

The cause of the temperature excursions is unknown. The most likely cause was a faulty connection to the transducer.

CORRECTIVE ACTION

No corrective action is required. This measurement is not mandatory for flight control, and excursions of this type will not affect system analysis.

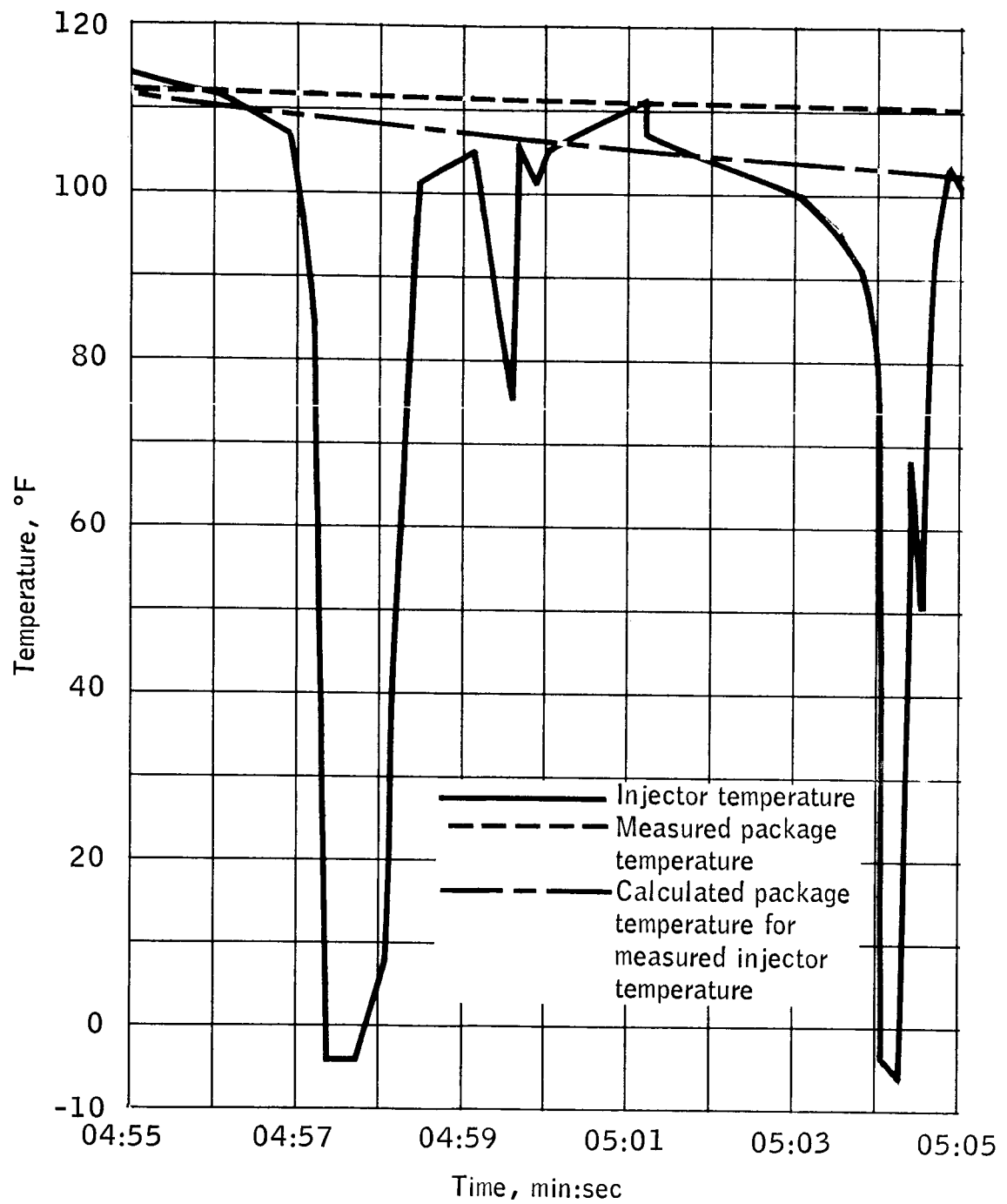


Figure 1.- Injector and package temperatures.

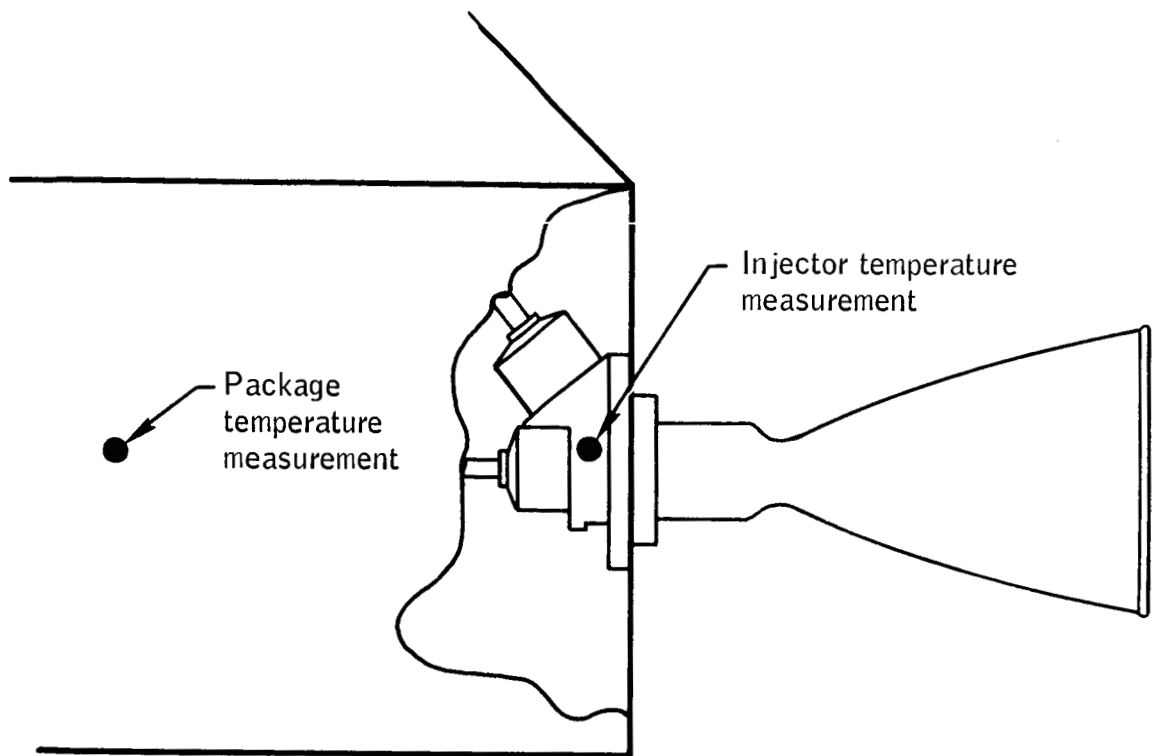


Figure 2.- Location of temperature measurements.